

A New Model for Internal Migration Estimation Based on Formal Records in Databases

Alireza Pakgohar^{*1}

¹Department of Statistics, Payame Noor University (PNU), PO BOX 19395 -4697 Tehran, Iran

^{*}a_pakgohar@pnu.ac.ir

Abstract

Migration rate is a piece of critical information in social studies. It seems that other methods, rather than census which can perform better in costs and data updating, are more preferable. The purpose of this study was to investigate the estimation methods for internal migration based on formal information existing in databases which government can access and control; as well to propose solutions for accurately estimating integrated internal migration with the county resolution. The data obtained from migrants suggested that accuracy rate for Ministry of Education's information portal was 93% regarding to migrant children records. The Health Ministry information database had a coverage rate of 38.6% for filing and 28.2% for frequent visits over the migrant population. In total, using Health Ministry, Education Ministry, Social security insurance organizations, and medical treatment services organization databases, in combination with government personnel information portal, it was possible to estimate the city to city movements with up to 80% reliability.

Keywords

Internal Migration; Statistical Estimation; Records Data; Census

Introduction

Birth, marriage, divorce, death, and migration are five characteristics of change and movements of population [Amani (1975)]. Migration is a word, which has been defined by various scientists due to their specific needs. Also demography researchers have defined this word according to their specific theories and viewpoints. "In demography, migration in general is the change in a person's living place from one point to another." [Lahsani Zadeh (1994)] Migration is divided into internal and international categories. (a) "Internal migration" is defined as all population movements inside the boundaries of a country [Zanjani (1997)]. Internal migration may take place from a city to another city, a village to a city, or from a village to another village (Tamanna,2005). (b)

"International or external migration" has been defined as moving from a country to other countries [Zaznjani (1997)]. War refugees and political asylum seekers are two forms of international immigrants, which occur under special conditions [Tamanna (2005)]. The institute in charge of recording internal migration statistics (population movements inside the country) is "the organization of status records". The main tool they use for analysing migration recording rate is the overall census which currently takes place every five years as a temporary procedure. Despite high attention, this procedure receives the credibility and practical accuracy from decision makers, which takes place in a far longer period compared to the developed countries, which submit their preliminary reports every three months and full detailed reports each year. [Internal Migration Estimates (<http://www.ssric.org>)] [Internal Migration within England and Wales, year ending June 2010 (June 2011)] [Marek Kupiszewski (1997)] [Martine Bell (1997)] [Philip Rees (1996)]. The other solution in Iran is to use social – statistical models to estimate the migration rate [Hosseini (2005)] [Kazemipoor (2004)] [Mahmoodian (2005)] [Mirzaii (2004)] [Karbasi (2011)] . This solution is based on a scientific and is widely used by all countries [Martine Bell (1997)].

The databases have a powerful synergy by recorded data storage and sharing. Some information existing in those government organization databases are such valuable that it takes costly efforts to achieve the same effect with the required accuracy rate; and maybe it is impossible in some cases. The Ministry of Education information database [Portal of Education Ministry (<http://sanad.org>)] keeps the records for all educational information from primary school level up to the high school, the healthcare and medical treatment and hospitals centers information database [Portal of Health Ministry (<http://port.health.gov.ir>)].

The databases are kept by insurance services organizations like the social security organization [Portal of Iran Health Organization (<http://www2.darman.sso.ir>)], Medical Service Insurance Organization (MSIO) [Statistical centre of Iran (<http://www.amar.org.ir/Default.aspx?tabid=116&ctl=Login&returnurl=%2fdefault.aspx>)], and other insurance institutes like: Armed Forces Insurance Organization, private and supplementary insurance ,Companies are some examples in this category. Statistical Centre of Iran [Household accounting management portal (www.refahi.ir)] can access the Iranian household information and now with the targeted subsidies plan implemented, and cash subsidies are paid to household members, currently can be updated up to 95% level of accuracy covered by household bank account management system [employees of the administrative system (<http://karmandiran.ir>)]. The national office system employee's organization [Rees (1996)] -which records and updates government personnel information, is capable of tracing occupational movements like job location changes, missions, etc.

Related Work

Some of the migration estimation methods use government data records information to do this task. Although this kind of estimates should not be regarded as accurate numbers and rates for table levels, it combines the data sources used by them, and assures us that most of internal migration movements are covered in those estimations [<http://www.ons.gov.uk/ons/guide-method/method-quality/imps/msi-programme/communication/improvements-mid-2008/methodology-papers/student-adjustment-detailed-methodology.pdf>]. For example, the main data source for internal migration in Australia is the five- year population and houses census. In addition, also estimations about interstate movements are published by Australian Bureau of Statistics (ABS) [Martine Bell (1997)]. It was estimated that about 5 percent of population in England and Wales had moved their residence place to some other parts of the country in 2010 [<http://www.ons.gov.uk/ons/rel/migration1/internal-migration-by-local-authorities-in-england-and-wales/2009-2010/index.html>]. Three government data sources were used to record the population movements (internal migrations) in England and

Wales which were: National Health Services Central Register (NHSCR), Patient Register Data Service (PRDS), and Higher Education Statistics Agency (HESA) [Internal Migration Estimates (<http://www.ssrc.org>)] [Internal Migration within England and Wales, year ending June 2010 (2011)]. Table of full data provided by Organization of National Statistics (ONS) website [www.statisticsauthority.gov.uk/assessment/assessment-report-8---migration-statistics--27-july-2009.pdf] and internal migration estimates, which were provided by local authorities, were considered as national statistics. These estimates were analyzed by British statistical authorities in 2009. The full report could be found at ONS website [www.nrscotland.gov.uk]. The office of National Records of Scotland (NRS) [www.dfpni.gov.uk] was in charge of estimating internal movements in Scotland and was called General Register Office for Scotland or GROS in the past. This responsibility was taken by Department of Finance and Personnel (DFP) in Northern Ireland [Pakgohar (2009)]. The internal migration reports were codified and published in formal report structure, under the higher management, financial support, and supervision of European Union [Hosseini (2005)]. In 1990, the European countries started their coordinated cooperation on Integrated Europe project. One main requirement for successful cooperation among these countries was that comparable and agreeable databases should be in place for each country and all of the regions, which showed the demography and economical situations clearly. Regarding the population statistics, the European council (established in 1995) provided some excellent statistics about population aggregation, demographic structure, births and deaths, also some acceptable statistics about international immigration at country level; while the European Statistics body (EUROSTAT) provided the same statistics for members of European Union in addition to full statistical details at region and state level for inside those countries.

Methodology

This was a preliminary study of descriptive-analytical type; and was conducted as a cross sectional study over a period of five years from 2006 to 2011 amongst the migrants whose last destination of movement was one of the cities or rural places inside Yazd province in Iran. The sample was selected using the snowball sampling method with size of 350 households which

included total 945 people. Among them, 25 households (67 people) were omitted at data cleaning stage; and 878 valid questionnaires from 335 households - which included at least one migrant member - were extracted. The purpose of this study was to examine the accuracy rate of four migration estimation methods, which were: (a) estimation method based on children educational status with Ministry of Education, (b) the estimation method based on insurance records, (c) estimation method based on job status, and (d) estimation method based on healthcare records of the person. The self reporting questionnaire was reviewed by the experts in Yazd Province Registrar Office. This study was conducted in accordance with project "a review study of migration recording methods in Europe and providing a proposed model for Iran, a subjective study on one of Yazd province regions" [Fallhzadeh (2006)], and Yazd province Registrar Office organization supported it. The questionnaire included some items regarding information like sex, age, reason for migration, numbers of migrations during last five years, job status, education status, insurance records and its type, healthcare filing records with healthcare and medical service centers, National ID, city or village of residence before migration, etc. The gathered data were analyzed by using adaptive tables method and SPSS 18 software.

Result

The average age of participants in our study was 25 years and half of them were younger than 25. And most of the people who migrated were 23 years old at the time of data collection. This suggests that, migration age in Yazd Province was in the youth and dynamic stages which itself was considered as a trait of migration. Among the family members, 35.5% of the household heads, 33.5% of the children, and 30% of the wives did migrate. Migration rates for different sexes in the households were equal. Married people accounted for 61.4 percent of migrants. Among the participants who migrated in years between 2006 and 2011 and reported the information about number of migrations, more than 80% were migrants at the first time and about 15% migrated twice in last five years ending in time of our study. About 4% others had changed their residence place more than twice due to migration. The main reasons for migration were "job search" or "better job" (19 percent). More than 17 percent of migrant households were considered as local residents of Yazd province which could be due to

two main reasons: they could be the children who were born after their household migrated to Yazd, or they could enter to the household because of marrying a migrant person. However, about 5% of cases had migrated to Yazd province because of marriage. Job search or better job had a 49 percent share in migration incentive among migrants. Education continuation and graduation (leaving the university) had a 16% share, and marriage had a 12% share among the most important reasons of migration into Yazd province.

The migration status had been analyzed based on two types of rural and urban population differentiated by 3 levels which are: Intra-county, intra-province, and out of province migration. More than 29% of migrants took place at intra-county level and village's share was about 30% of population movement. The ratio of village to city migration in county level was 2.5 times than the same ratio outside the county. Among 71 percent of out of Yazd province migrants, 89 percent came from cities and 11 percent came from villages. This confirmed that rural residents migrate in shorter distances. Among the family members, most migrants were members of families with one or two children. Our study shows that 36 percent of migrants were single. Their average age was 35 years, and demographic ratio between men and women was nearly equal. 44% of members in migrant households were not considered as migrants themselves. Amongst over 18 year-old participants, 18.7% were unemployed and 17.3% had undetermined job status. Also 3.9% participants had temporary daily work jobs, and 12.6% had special job status other than those enumerated above. Of the participants between 6 and 18 years old who were at school age according to the Ministry of Education system, about 7% were not enrolled at schools and the rest were enrolled in one of schools under supervision of Ministry of Education. This suggested that the migration recording accuracy of Education ministry information system was about 93% for the people who were subject to be a student in this system. Amongst the under 6 year-old children, 16.3% were nurtured in kindergartens (Table 1). Therefore, the accuracy rate of education system information (including schools and kindergartens) was about 55.2% overall. Among the participants older than 18, 18.7% were unemployed, 17.3% had undetermined jobs and 3.9% of them had temporary daily paid jobs while 12.6% of participants had specific jobs other than above jobs. If we considered all these categories as ambiguous migration status, then the migration recording accuracy based on job status would be equal

to 47.5 percent. 38.6 percent of participants in our study reported that have filed and registered with local health authorities in their residence location, and 21.4% did not indicate whether they filed with those authorities or not, while 40% remaining participants did not register at all. The migration recording accuracy based on health profile register would be equal to 38.6% if we considered the filing with local health authorities as an indicative factor for people's migration status. Also if frequent visits or not visiting health centers were considered as ambiguous items in migration status determination according to Table 3, then recording accuracy would be about 28.2% based on visiting health centers. Combining these two pieces of information of Table 3 suggested that accuracy rate provided by healthcare networks on migration recording was equal to 60.4 percent. Amongst the participants who answered our questionnaire, 13% of which were covered by Medical Services Insurance, 64.7% were covered by Social Security Insurance, 6.8% were covered by armed forces insurance, 5.9% were covered by private insurance companies, and finally 9.6% were not covered by any type of insurances. The information in Table 2 suggests that about 91.1% of participants are covered at least by one insurance system. As the insured person could be dependent on one of other family members, and our goal in this study was to determine the insurance status in respect to person's work place – the insurance status for over 18 year-old participants who had one of the five job status codes (employer, private sector, public sector, or corporation employee, or independent worker) were summarized in Table 4. The migration recording accuracy rates were given in Fig.2 based on adaptive multilayer table. This graph showed that migration recording accuracy for over 18 participants based on health centers' information, job status, and insurance coverage was 77.4 percent. Similarly, the migration recording accuracy for less than 18 years old participants equaled to 86.9% based on health centers' information, educational status, or whether they were enrolled in kindergartens. Overall combination of this information about participants suggested that migration recording accuracy of even higher than 79% for all the people.

Conclusion

Internal migration is a demographic phenomenon extensively interacting with social, economical and cultural aspects of the society. As no direct scale measures the migration rate between census periods,

the substitute data are used to interpolate this variable. This means that any discrepancy of covered data between the specified statistical phenomenon and substitute phenomenon – which is used for measurement purpose – will affect the quality of estimations. Several estimation methods based on formal data are introduced recently. For example, Organization of National Statistics (ONS) is in charge of providing estimations of internal migration in England and Wales. However, migration is considered as the most difficult factor of population change to estimate, because no mandatory system exists in UK in which people are required to report their movements inside the country. Currently ONS combines three government databases' information and uses them as a substitute data source for internal migration in England and Wales. These three sources are: National Health Services Central Register (NHSCR), Patient Register Data Service (PRDS), and Higher Education Statistics Agency (HESA). Therefore, looking at past experiences and available government resources, we can expect the Iranian Center of Statistics to cover full population of the country. Also the current accuracy of estimations extracts from children's educational information and students under coverage of Education Ministry give hope for more synergy in combined data. For this task, we must improve the accuracy of the information we have about insurance services and job records (and are traceable). It must be reminded that these estimates have to be regarded as logically reliable numbers for calculating demographic estimations by a government body or evaluating whether internal migration has increased in a specific region of the country or decreased. They must not be considered as a suitable substitute for overall censuses.

Despite some limitations in information coverage over population movements, the estimation methods have many advantages as well. For example, we know that jobs can be one place and the family could live in another place. Therefore, insurance coverage also has to be taken into consideration. Or the behaviors of health network employees could affect the frequency of visit by the patients such that they prefer far travel over bad encounter. This could be the case for nearby cities. Similarly, in villages, the mentioned issue plus lack of facilities and services can stimulate the patients to refer to nearby cities or register in both places. It is known that the double registering patterns vary by different age and sex groups. For example, the past studies have shown that children, youth, their mothers, and elderly are more likely to register their

new address in a shorter time after moving. While young men need more time in comparison to women at the same age group to report the change in their place of residence [Internal Migration Estimates (<http://www.ssrc.org>)]. Women are usually expected to use health services more frequently than men [Noorbala (2011)], so we expect the register rate in health services network to be higher for women than to men. On the other hand, there is some possibility of double register after a change in residence place, while the old file(s) are still open. In general, this likelihood is lower for young and healthy people and their names are more likely to get omitted from patient list records. However, as the family doctor system gets established in cities and formal data are available from education system, government formal information, and social security insurance systems (in which the work place code indicates residence place for the insured person), we can expect to obtain some low error, revisable data, which helps estimating internal migration rates. The more macroscopic we look, the less our migration estimate errors would be.

ACKNOWLEDGMENT

Hereby the author needs to thank all the project team who devotedly helped during this study. In addition, they would like to thank. We are sincerely grateful to National Organization for Civil Registration for Supported by our studies.

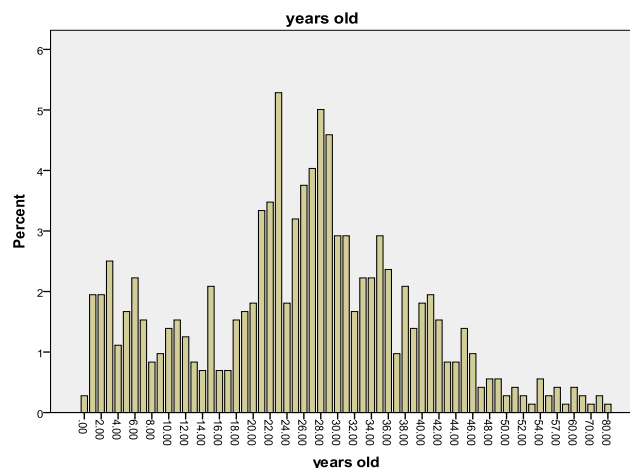


FIG.1 MIGRANT AGE DISTRIBUTION

TABLE 1 EDUCATIONAL STATUS FREQUENCIES FOR MIGRANTS BETWEEN 6 AND 18

Level of Education	percent %
primary school	50
Guidance school	21
High school	17
conservatory and tech schools	5
not determined	7
total	100

TABLE 2 FREQUENCY OF INSURANCE COVERAGE FOR MIGRANTS

	Frequency	percent
Medical Services Ins.	86	13.4
Social Security Ins.	415	64.6
Armed Forces Ins.	45	7.0
Private Ins. Companies	39	6.1
No Insurance	57	8.9
Total	642	100.0

TABLE 3 RATE OF FREQUENT VISIT ON HEALTHCARE NETWORK CENTRES AND FILING STATUS

		rate of frequent visit on healthcare network						Total
		once a month	once in 3 months	once in 6 months	some times	No	Undetermined	
Has filed with health authorities?	YES	73	37	24	167	24	14	339
	NO	3	1	0	16	299	32	351
	U. D.	1	4	0	2	15	166	188
	Total	77	42	24	185	338	212	878

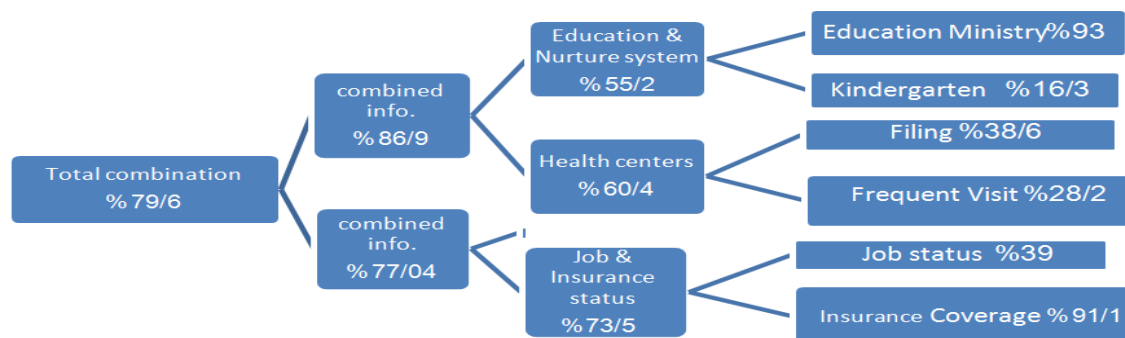


FIG.2 ACCURACY RATE OF ESTIMATION METHODS FOR FORMAL DATA FROM HEALTHCARE, EDUCATION, SOCIAL SECURITY AND HUMAN RESOURCES SYSTEMS IN IRAN

TABLE 4 INSURANCE COVERAGE AND JOB STATUS FOR OVER 18 MIGRANTS

Job Status	Insurance Coverage				
	Medical Services	Social Security	Armed forces	Private Ins.	None
employer	2	11	0	0	2
Independent worker	10	22	1	7	5
Public/government employee	20	78	15	5	0
Private sector employee	2	85	3	4	4
Unions sector employee	0	1	0	0	0
Daily paid worker	0	11	0	2	7
Unemployed	17	79	9	4	11
other	12	45	8	4	12
Undetermined	14	66	7	11	13
Total	82	415	44	39	57

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Alireza Pakgohar was born in Kerman, Iran, in 1975. He received the B.A. degree in Statistics from the University of Payame Noor, Isafahan, Iran, in 2001, and the M.A. degree in Statistics from the Islamic Azad University, Mashhad, Iran, in 2004 and He is studying at Ph.D. degree in Statistics in Ferdowsi University of Mashhad, international Campus, Mashhad, Iran from 2012.

In 2004, he joined the Department of Traffic Management, Police University (Oloome entezami), Tehran, Iran as a lecturer and joined the research centre of Traffic police, as a Consultant in 2005; and in 2006 became a faculty member on Islamic Azad University, Ayatollah Amoli Branch and Head of Evaluation and Supervision Office in this university as well. Since December 2007, he has been with the Department of Statistics, Payame Noor University (PNU), as a faculty member. His interesting is Socio-Economic researching specialty on traffic crashes. He was the General Chair of the International Conference on Statistics in Science, Business, and Engineering (ICSSBE), 2012. Two books have been published by Alireza Pakgohar, "Statistics in Traffic Management" and "Data Analysis and Using SPSS".